

WHAT IS CLAIMED IS:

1. A display device comprising:
a display;
5 a display controller;
a first means for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and
10 a second means not for dividing one frame period into a plurality of subframe periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and for operating the display with a lower clock frequency and a lower driving voltage than the first means,
15 wherein the first and second means are controlled by the display controller.

2. A display device comprising:
a display;
a display controller;
20 a first means for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and
a second means not for dividing one frame period into a plurality of subframe
25 periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and having a longer frame period as compared to the one frame period for expressing n-bits gradation and operating the display with a lower clock frequency and a lower driving voltage than the first means,
30 wherein the first and second means are controlled by the display controller.

3. A display device according to claim 1,
wherein the display device further comprises a frame memory;
n-bits data (n is a natural number of two or more) is written and read out to
35 perform a display operation in the first means; and
1-bit data is written and read out to perform a display operation in the second

means.

4. A display device according to claim 2,
wherein the display device further comprises a frame memory;
5 n-bits data (n is a natural number of two or more) is written and read out to
perform a display operation in the first means; and
1-bit data is written and read out to perform a display operation in the second
means.

10 5. A display device according to claim 1,
wherein the display device further comprises a light emitting element for each
pixel;
a specific voltage is applied to the light emitting element; and
a voltage applied to the light emitting element in the first means is higher than a
15 voltage applied to the light emitting element in the second means.

6. A display device according to claim 2,
wherein the display device further comprises a light emitting element for each
pixel;
20 a specific voltage is applied to the light emitting element; and
a voltage applied to the light emitting element in the first means is higher than a
voltage applied to the light emitting element in the second means.

7. A display device according to claim 1,
25 wherein the display device further comprises a light emitting element for each
pixel;
a specific current is supplied to the light emitting element; and
a current supplied to the light emitting element in the first means is larger than a
current supplied to the light emitting element in the second means.

30 8. A display device according to claim 2,
wherein the display device further comprises a light emitting element for each
pixel;
a specific current is supplied to the light emitting element; and
35 a current supplied to the light emitting element in the first means is larger than a
current supplied to the light emitting element in the second means.

9. A display device according to claim 1,
wherein the one frame period of the first means is composed of three periods of a
write-in period, a display period, and an erasing period.

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10. A display device according to claim 2,
wherein the one frame period of the first means is composed of three periods of a
write-in period, a display period, and an erasing period.

10 11. A display device according to claim 1,
wherein the display controller operates at a lower voltage in the second means as
compared to in the first means.

12. A display device according to claim 2,
15 wherein the display controller operates at a lower voltage in the second means as
compared to in the first means.

13. A display device comprising:
a display;
20 a display controller;
a first means for dividing one frame period into a plurality of subframe periods and
setting one of lighting and non-lighting to each of the plurality of subframe periods, and
for expressing n-bits gradation (n is a natural number of two or more) in accordance
with a total lighting time during the one frame period; and
25 a second means for dividing one frame period into a plurality of subframe periods
and setting one of lighting and non-lighting to each of the plurality of subframe periods,
for expressing m-bits gradation (m is a natural number less than n) in accordance with a
total lighting time during the one frame period, and for operating the display at a lower
clock frequency and a lower driving voltage than the first means,
30 wherein the first and second means are controlled by the display controller.

14. A display device according to claim 13,
wherein the display device further comprises a frame memory;
n-bits data (n is a natural number of two or more) is written and read out to
35 perform a display operation in the first means; and
m-bits data (m is a natural number less than n) is written and read out to perform a

display operation in the second means.

15. A display device according to claim 13,
wherein the display device further comprises a light emitting element for each
5 pixel;
a specific voltage is applied to the light emitting element; and
a voltage applied to the light emitting element in the first means is higher than a
voltage applied to the light emitting element in the second means.

10 16. A display device according to claim 13,
wherein the display device further comprises a light emitting element for each
pixel;
a specific current is supplied to the light emitting element; and
a current supplied to the light emitting element in the first means is larger than a
15 current supplied to the light emitting element in the second means.

17. A display device according to claim 13,
wherein the one frame period of the first means is composed of three periods of a
write-in period, a display period, and an erasing period.

20 18. A display device according to claim 13,
wherein the one frame period of the second means is composed of three periods of
a write-in period, a display period, and an erasing period.

25 19. A display device according to claim 13,
wherein the display controller operates at a lower voltage in the second means as
compared to in the first means.

20. A method of driving a display device having a display and a display controller,
30 comprising:
a first display mode for dividing one frame period into a plurality of subframe
periods and setting one of lighting and non-lighting to each of the plurality of subframe
periods, and for expressing n-bits gradation (n is a natural number of two or more) in
accordance with a total lighting time during the one frame period; and
35 a second display mode not for dividing one frame period into a plurality of
subframe periods and setting one of lighting and non-lighting to the one frame period,

for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and for operating the display at a lower clock frequency and a lower driving voltage than the first display mode,

wherein the first and second display modes are controlled by the display controller.

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21. A method of driving a display device having a display and a display controller, comprising:

a first display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and

a second display mode not for dividing one frame period into a plurality of subframe periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and having a longer frame period than the first display mode and operating the display at a lower clock frequency and a lower driving voltage than the first display mode,

wherein the first and second display modes are controlled by the display controller.

22. A method of driving a display device according to claim 20,

wherein the display device further comprises a frame memory;

n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

1-bit data is written and read out to perform a display operation in the second display mode.

23. A method of driving a display device according to claim 21,

wherein the display device further comprises a frame memory;

n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

1-bit data is written and read out to perform a display operation in the second display mode.

24. A method of driving a display device according to claim 20,

wherein the display device further comprises a light emitting element for each pixel;

a specific voltage is applied to the light emitting element; and
a voltage applied to the light emitting element in the first display mode is higher
than a voltage applied to the light emitting element in the second display mode.

5 25. A method of driving a display device according to claim 21,
 wherein the display device further comprises a light emitting element for each
 pixel;
 a specific voltage is applied to the light emitting element; and
 a voltage applied to the light emitting element in the first display mode is higher
10 than a voltage applied to the light emitting element in the second display mode.

 26. A method of driving a display device according to claim 20,
 wherein the display device further comprises a light emitting element for each
 pixel;
15 a specific current is supplied to the light emitting element; and
 a current supplied to the light emitting element in the first display mode is larger
 than a current supplied to the light emitting element in the second display mode.

 27. A method of driving a display device according to claim 21,
 wherein the display device further comprises a light emitting element for each
20 pixel;
 a specific current is supplied to the light emitting element; and
 a current supplied to the light emitting element in the first display mode is larger
 than a current supplied to the light emitting element in the second display mode.

25 28. A method of driving a display device according to claim 20,
 wherein the first display mode is composed of three periods of a write-in period, a
 display period, and an erasing period.

 29. A method of driving a display device according to claim 21,
30 wherein the first display mode is composed of three periods of a write-in period, a
 display period, and an erasing period.

 30. A method of driving a display device according to claim 20,
 wherein the display controller operates at a lower voltage in the second display
35 mode as compared to in the first display mode.

31. A method of driving a display device according to claim 21,
wherein the display controller operates at a lower voltage in the second display mode as compared to in the first display mode.

5 32. A method of driving a display device having a display and a display controller, comprising:

 a first display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in
10 accordance with a total lighting time during the one frame period; and

 a second display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, for expressing m-bits gradation (m is a natural number less than n) in accordance with a total lighting time during the one frame period, and for operating the
15 display at a lower clock frequency and a lower driving voltage than the first display mode,

 wherein the first and second display modes are controlled by the display controller.

33. A method of driving a display device according to claim 32,
20 wherein the display device further comprises a frame memory;
 n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

 1-bit data is written and read out to perform a display operation in the second display mode.

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34. A method of driving a display device according to claim 32,
wherein the display device further comprises a light emitting element for each pixel;

 a specific voltage is applied to the light emitting element; and
30 a voltage applied to the light emitting element in the first display mode is higher than a voltage applied to the light emitting element in the second display mode.

35. A method of driving a display device according to claim 32,
wherein the display device further comprises a light emitting element for each
35 pixel;

 a specific current is supplied to the light emitting element; and

a current supplied to the light emitting element in the first display mode is larger than a current supplied to the light emitting element in the second display mode.

36. A method of driving a display device according to claim 32,
5 wherein the first display mode is composed of three periods of a write-in period, a display period, and an erasing period.

37. A method of driving a display device according to claim 32,
10 wherein the second display mode is composed of three periods of a write-in period, a display period, and an erasing period.

38. A method of driving a display device according to claim 32,
15 wherein the display controller operates at a lower voltage in the second display mode as compared to in the first display mode.

39. A display device according to claim 1, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

40. A display device according to claim 2, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

41. A display device according to claim 13, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

42. A method of driving a display device according to claim 20, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

43. A method of driving a display device according to claim 21, wherein the

display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

- 5 44. A method of driving a display device according to claim 32, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.